REMARKS

Applicant thanks the Examiner for his comments on the drawings and advises that formal drawings will be filed once allowable subject matter has been indicated.

Claims 1-18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kaufman (U.S. Patent No. 4,862,032), or Yoshikawa (U.S. Patent No. 4,703,222) or Alexander (U.S. Patent No. 4,845,364) in view of Murakoshi (GB 2295268). Applicant has amended the claims to more particularly define the present invention. Applicant respectfully asserts that these prior art references fail to teach or suggest all of the elements and limitations of the claims as amended.

For example, independent claim 1 is directed to an ion source that includes "means for concentrating said electron flow to create a region within said ionisation region and along said longitudinal axis where the electron flux is maximum" in addition to "gas introducing means [including] at least one aperture that is disposed substantially adjacent to said longitudinal axis such that said ionisable gas is introduced into said ionisation region at a localised area in proximity to said region of maximum electron flux." Advantageously, these features enable a plasma to be maintained over a wider range of gas flow rates. These features also enable lower gas flow rates to achieve equivalent or higher beam currents. Neither Kaufman, Yoshikawa, Alexander, Murakoshi, nor any combination thereof, teach or suggest these features. More specifically, the ion source of Kaufman (col. 3 lines 46-50 and Figs. 1 and 3) introduces

gas into the system through apertures 44 in a distributor 42. Importantly, the apertures 44 of Kaufman are located far outside the longitudinal axis that extends generally between the anode 24 and the cathode 22. With respect to the ion accelerator of Yoshikawa et al. (Fig. 1), gas is introduced into the system through a side port GI. Importantly, the side port is located far outside the longitudinal axis of the coaxial anodes AA1, AA2 and cathode terminals AC1, AC2. Moreover, the coaxial anodes AA1, AA2 and cathode terminals AC1, AC2 define an annular discharge region (where ionization occurs) that is offset radially with respect to the longitudinal axis of the coaxial anodes AA1, AA2 and cathode terminals AC1, AC2. With respect to the ion accelerator of Alexander al. (col. 6, lines 6-17 and Fig. 1), gas is introduced into the system through a gas pipe 174 that is offset radially with respect to the anode terminal 103 and cathode filament 125. Thus, the gas pipe 174 of Alexander does not teach or suggest an aperture that is disposed substantially adjacent to a longitudinal axis that extends generally between the anode terminal 103 and the cathode filament 125. Finally, with respect to the ion generators of Murakoshi (Figs. 3/7), gas is introduced into the system through a gas line 32/52 that are disposed in a side walls 31/51 of the system. Importantly, the gas line 32/52 is offset radially with respect to a longitudinal axis that extends generally between the anode terminal 34/54 and cathode terminal 37/57 of the system. Thus, the gas line 32/52 of Murakoshi fails to teach or suggest an aperture that is disposed substantially adjacent to a longitudinal axis that extends generally between the anode terminal and cathode terminal of the system as recited in claim 1. Thus, as detailed above, the references cited by the Examiner, individually and/or collectively, fail to teach or suggest essential elements of

or suggest essential elements of claim 1. It is therefore Applicant's contention that claim 1 is patentable over these references and the rejection of the claim 1 is hereby traversed.

Dependent claims 2-13 are patentable over the cited references for those reasons advanced above with respect to claim 1 from which they respectively depend and for reciting additional features that are neither taught nor suggested by the cited references. For example, claim 6 recites that the gas introducing means includes "[an] outlet member [that] is electrically conductive and is maintained at substantially the same potential as the anode. Nowhere does the cited prior art references teach or suggest this feature. Thus, Applicant respectfully asserts that dependent claims 2-13 are patentable over the cited prior art.

Independent claim 14 is directed to an ion source that includes, *inter alia*, " [an] anode [having] at least one surface exposed to said ionisation region, at least a portion of said at least one exposed surface being of an electrically conductive non-oxidising material." Advantageously, this feature avoids build up of a dielectric layer on the anode, which leads to unwanted shielding of the anode potential. Neither Kaufman, Yoshikawa, Alexander, Murakoshi, nor any combination thereof, teach or suggest these features. The Examiner points to Murakoshi as suggesting this feature. Applicant respectfully disagrees. Murakoshi discloses an ion source wherein the walls of the ionisation chamber have Molybdenum as the main ingredient. Murakoshi teaches that the chamber walls can often be sputtered, leading to contamination of the deposited film or unwanted deposition on other parts of the ion source such as the cathode. That is, the problem that Murakoshi

is concerned with is the removal of material from the chamber walls. Murakoshi teaches a solution where the chamber walls are coated to prevent the walls from being sputtered, thus making the walls resistant to chemical etching by ions and radicals. By contrast, the present application teaches on page 2 lines 11 to 27, that the present inventor has identified that one cause of instability in prior art sources is the build up of a dielectric layer on the anode which leads to shielding of the anode potential. The present application teaches a solution to this problem, that being to provide the anode with an exterior surface of an electrically conducting non-oxidising material. This solution is the subject matter of claim 14. That is, the present invention as defined by claim 14 is concerned with unwanted deposition from the source gas, not sputtering by ions and radicals as described in Murakoshi. Furthermore, it is deposition on the anode, rather than the chamber walls, that is the concern of the present invention as defined by present claim 14. For these reasons, it is respectfully submitted that the ion source of claim 14 is neither taught nor suggested by Murakoshi.

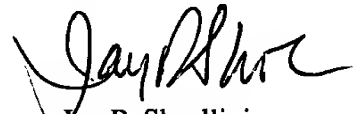
Dependent claims 15-18 are patentable over the cited references for those reasons advanced above with respect to claim 14 from which they respectively depend and for reciting additional features that are neither taught nor suggested by the cited references.

In the amendment above, Applicant has submitted herewith new claims 19 to 22, the basis for which can be found in Figures 1 to 3, claims 5 to 7 and the description page 5, line 4 to page 6, line 3. Applicant respectfully submits that no new subject matter has

been added by these claims. Applicant further submits that these claims are patentable over the prior art of record for the reasons discussed above.

In light of all of the above, it is submitted that the claims are in order for allowance, and prompt allowance is earnestly requested. Should any issues remain outstanding, the Examiner is invited to call the undersigned attorney of record so that the case may proceed expeditiously to allowance.

Respectfully submitted,



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